ABSTRACT OF THE DISCLOSURE

An electric field activated molecular system, preferably bi-stable, configured within an electric field generated by a pair of electrodes is provided for use, e.g., as electronic ink or other visual displays. The molecular system has an electric field induced band gap change that occurs via a change (reversible or irreversible) of the extent of the electron conjugation via chemical bonding change to change the band gap, wherein in a first state, there is substantial conjugation throughout the molecular system, resulting in a relatively smaller band gap, and wherein in a second state, the substantial conjugation is destroyed, resulting in a relatively larger band gap. The changing of substantial conjugation may be accomplished in one of the following ways: (1) charge separation or recombination accompanied by increasing or decreasing electron localization in the molecule; or (2) change of substantial conjugation via charge separation or recombination and π-bond breaking or making. A primary advantage of the molecular system is improved contrast. Because the colorant of the present invention is molecular and thus effectively monoplanar, there should be no backside reflection or excessive scattering from the colorant. A second advantage of the present invention is improved resolution. Finally, each molecule of the present invention will latch to stabilize one or the other of its color states.